

> s bioglass and sol(w)gel

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      184 BIOGLASS
      17540 SOL
      152668 GEL
      3081 SOL(W)GEL
L5      6 BIOGLASS AND SOL(W)GEL
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=> s 15 and (bone or defect)

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      30404 BONE
      47876 DEFECT
L6      6 L5 AND (BONE OR DEFECT)
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=> d 15 1-6

1. 5,693,513, Dec. 2, 1997, Encapsulation of living tissue cells in an organosilicon; Edward J. A. Pope, 435/176, 182, 382 [IMAGE AVAILABLE]
2. 5,681,872, Oct. 28, 1997, Bioactive load bearing bone graft compositions; Erik M. Erbe, 523/114; 106/35, 634, 691; 260/998.11; 501/70; 523/113, 115; 524/414, 456 [IMAGE AVAILABLE]
3. 5,676,720, Oct. 14, 1997, Method of forming a porous glass substrate; Paul Ducheyne, et al., 65/17.5, 17.3, 17.6, 22, 23, 31, 33.1, 33.9 [IMAGE AVAILABLE]
4. 5,648,301, Jul. 15, 1997, Bioactive material template for in vitro synthesis of bone tissue; Paul Ducheyne, et al., 501/39, 55, 63, 70 [IMAGE AVAILABLE]
5. 5,643,789, Jul. 1, 1997, Bioactive material template for in vitro synthesis of bone tissue; Paul Ducheyne, et al., 435/402; 424/422; 435/1.1, 325, 378 [IMAGE AVAILABLE]
6. 5,074,916, Dec. 24, 1991, Alkali-free bioactive **sol-gel** compositions; Larry L. Hench, et al., 106/35; 423/308, 311; 501/2, 5, 10, 63, 72, 80; 623/11, 16 [IMAGE AVAILABLE]

=> d 15 1 6 clms

US PAT NO: 5,693,513 [IMAGE AVAILABLE]

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CLAIMS:

CLMS(1)

What is claimed is:

1. A process for encapsulating living tissue cells in an inorganic gel comprising the steps of:
  - a. mixing an organosilicon precursor and an acidic solution which is highly aqueous having a molar concentration of acid in the range of 0.05 to 2.5 to form a gel forming solution wherein said organosilicon precursor is selected from a group consisting of tetraethoxysilane, tetrabutoxysilane, tetramethoxysilane and tetrapropoxysilane;
  - b. stirring said gel forming solution until said gel forming solution

becomes clear whereby water in said highly aqueous acidic solution hydrolyzes said organosilicon precursor;

- c. chilling said gel forming solution in an ice bath;
- d. mixing living tissue cells and Hank's balanced salt solution to form a mixture of tissue cells and Hank's balanced salt solution;
- e. adding a base solution having a molar concentration of base in the range of 0.05 to 2.5 to said gel forming solution to form a mixture of said gel forming solution and said base solution;
- f. immediately thereafter adding said mixture of tissue cells and Hank's balanced salt solution to said mixture of said gel forming solution and said base solution and stirring to form a mixture of said gel forming solution and said base solution with said mixture of said tissue cells and Hank's balanced salt solution; and
- g. pouring into a container said mixture of said mixture of said gel forming solution and said base solution with said mixture of tissue cells and Hank's balanced salt solution to form an inorganic gel encapsulating said living tissue cells.

US PAT NO: 5,074,916 [IMAGE AVAILABLE]

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#### CLAIMS:

##### CLMS(1)

What is claimed is:

1. A bioactive composition prepared using a **sol-gel** process, and consisting essentially of more than 60 but no more than 86 weight percent SiO.sub.2, at least 4 but less than 33 weight percent CaO and at least 3 but no more than 15 weight percent P.sub.2 O.sub.5.

##### CLMS(2)

2. The composition of claim 1 wherein the bioactive glass forms a hydroxyapatite layer upon exposure to body fluids.

##### CLMS(3)

3. The composition of claim 1, wherein the bioactive glass is produced as a powder using a **sol-gel** process.

##### CLMS(4)

4. The composition of claim 1, wherein the bioactive glass is produced as a monolith using a **sol-gel** process.

##### CLMS(5)

5. The composition of claim 1, wherein the bioactive glass is produced as a coating using a **sol-gel** process.

##### CLMS(6)

6. A bioactive glass powder consisting essentially of SiO.sub.2, CaO and P.sub.2 O.sub.5, prepared using a **sol-gel** process, and having pores with a diameter range of from about 1.2 to about 10 nm and a surface area of at least 200 m.sup.2 /g, wherein the weight percentage of SiO.sub.2 is more than 60 but no more than 86, the weight percentage of CaO is at least 4 but less than 33, and the weight percentage of P.sub.2 O.sub.5 is at least 3 but no more than 15.